

## **REMARKS**

Claims 29, 30, 32-39, 41-45, 48-51, 55-57 and 59-66 are pending in the present application. Claims 31, 40, 46, 47, 52-54 and 58 have been canceled. Claim 49 has been amended. Claims 65 and 66 have been added.

1. Claims 29, 30, 32-35, 39, 41, 48-51, 54, and 60-64 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Prasad et al (5,888,272) in view of Anderson et al. (US 6,505,567).

Regarding independent claims 29 and 49, Examiner contends that. "Prasad et al. discloses an ion transport membrane fed with pressurized air, which are known for the use in production of oxygen in a gas separation process. Prasad et al. furthermore discloses the integration of an ion transport membrane-combustion module into a furnace atmosphere that is clean so as to form a singular unit so as to create a heated oxygen which is directed into the furnace (firebox) to aid in combustion." Further, Prasad et al. discloses all the limitations of this claim, except that Prasad et al. does not "disclose the specific environment of a circulating fluidized bed boiler for which the ion transport membrane would be operating in."

The Examiner therefore further contends that, "Anderson et al. teaches a circulating fluidized bed boiler (10) having a fire box (12) in which solid fuel is combusted in the presence of oxygen to generate flue gases containing heated solids, a fluidized bed (36) containing the heated solids fluidized by the fluidization gas. (Anderson et al. have a separator 18 which separates out the heated solids which flow to fluidized bed 36). Examiner therefore concluded that, "it would have been obvious to one having ordinary skill in the art at the time of the invention to incorporate the ion transport membrane (oxygen transport membrane) into the fluidized bed (36) of Anderson et al." Applicants respectfully traverse Examiner's rejection.

Regarding independent claim 29, Prasad et al. in view of Anderson et al. do not teach or suggest all the elements of independent claim 29. Neither reference teaches or suggests providing a fluidized bed comprising heated solids from the generated flue gas, and then disposing an oxygen transport membrane in the fluidized bed, as recited in claim 29.

In combining Prasad et al. and Anderson et al., Examiner asserts that one skilled in the art would dispose an oxygen transport membrane in the fluidized bed of a circulating fluidized bed boiler. However, Prasad et al. shows in Fig 4 an ion transport membrane 120 spaced from the

combuster 130 to provide a hot zone 138 therebetween. This spacing is necessary to permit the internal circulation of the flue gas to sweep the oxygen from the ion transport membrane. (col. 15, lines 15-30) Further Anderson et al. is silent as to disposing the oxygen transport membrane within a fluidized bed. In fact, Anderson et al. teaches away from disposing the membrane within a fluidized bed. Anderson et al. shows a separate oxygen source 140 whereby the output oxygen is heated using an air preheater 144.

Based upon the combined teachings of Prasad et al. and Anderson et al., Applicants contend that neither reference teaches or suggests the limitations of independent claim 29, as claimed by Applicants.

Regarding independent claim 49, neither Prasad et al. or Anderson et al. teach or suggest the limitations of claim 49, as amended. Specifically, neither reference teaches or suggests heating an oxygen transport member with sufficient heat provided by a fluidized bed of hot solids separated from a flue gas of a fire box, as newly claimed. As noted hereinbefore, Prasad et al. teaches providing a flue gas stream across the ion transport membrane for sweeping the oxygen away from the membrane. Therefore, Prasad et al. teaches away from the Applicants claimed invention of amended claim 49.

Applicants therefore respectively assert that claims 29 and 49 are patentable over Prasad et al. in view of Anderson et al. for at least these reasons. It is respectfully requested that these claims be reconsidered and allowed.

5. Claims 29, 30, 32-35, 39, 41, 48-51, and 60-64 variously depend on independent claims 29 and 49, and therefore, are patentable over Prasad et al. in view of Anderson et al. for at least the reasons provided hereinbefore. It is respectfully requested that these claims be reconsidered and allowed.

Claim 54 has been canceled, and therefore this rejection is now moot.

6. Claims 36, 52 and 59 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Prasad et al. (5,888,272) in view of Anderson et al. (6,505,567) and further in view of Belin (6,532,905).

Claims 36 and 59 variously depend on independent claims 29 and 49 respectively, and therefore, are patentable over Prasad et al. in view of Anderson et al. and further in view of Belin et

al. for at least the reasons provided hereinbefore. It is respectfully requested that these claims be reconsidered and allowed.

Claim 52 has been canceled, and therefore this rejection is now moot.

7. Claim 37 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Prasad et al (5,888,272) in view of Anderson et al. (6,505,567) and further in view of Hyppanen (5,476,639).

Claim 37 depends on independent claim 29, and therefore, is patentable over Prasad et al. in view of Anderson et al. and further in view of Hyppanen for at least the reasons provided hereinbefore. It is respectfully requested that this claim be reconsidered and allowed.

8. Claims 38 and 51 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Prasad et al. (5,888,272) in view of Anderson et al. (US 6,505,567) and Hyppanen (5,476,639) and further in view of Dietz (5,054,436).

Claims 38 and 51 depend on independent claim 29, and therefore, are patentable over Prasad et al. in view of Anderson et al. and Hyppanen and further in view of Dietz for at least the reasons provided hereinbefore. It is respectfully requested that these claims be reconsidered and allowed.

9. Claims 42 and 55 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Prasad et al. (5,888,272) in view of Anderson et al. (6,505,567) and further in view of Rogut. (5,284,583).

Claims 42 and 55 depend on independent claims 29 and 49 respectively, and therefore, are patentable over Prasad et al. in view of Anderson et al. and further in view of Rogut for at least the reasons provided hereinbefore. It is respectfully requested that these claims be reconsidered and allowed.

10. Claims 43-45 and 56 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Prasad et al. (5,888,272) in view of Anderson et al. (6,505,567) and further in view of Besecker et al.. (7,125,528).

Claims 43-45 and 56 depend on independent claims 29 or 49, and therefore, are patentable over Prasad et al. in view of Anderson et al. and further in view of Besecker et al. for at least the reasons provided hereinbefore. It is respectfully requested that these claims be reconsidered and allowed.

11. Newly added dependent claims 65 and 66 depend on independent claim 49, and therefore, are patentable for at least the reasons provided hereinbefore. It is respectfully requested that these claims be allowed.

12. A petition for a three month extension of time is provided herewith. Please charge the fee of **\$1110.00** for the petition for the extension of time to Deposit Account No. 03-2578 Order No. VA30455. Any deficiency or overpayment should be charged or credited to this Deposit Account.

Respectfully submitted,  
Jean-Xavier Morin et al.

/Robert D. Crawford/  
Robert D. Crawford  
Registration No. 38,119

Date: May 18, 2009

ALSTOM Power Inc.  
2000 Day Hill Road  
Windsor, Connecticut 06095  
Phone: (860) 285-9117  
Fax: (860) 285-3515